

Open Geospatial Consortium, Inc. OpenGIS ® KML

1 Status of this Memo

This is a description of an ESDS Community Standard.

Distribution of this memo and the referenced standard is unlimited.

2 Change Explanation

Version 1.0

3 Copyright Notice

The contents of this document are not protected by copyright in the United States.

4 Abstract

In 2008, the Open Geospatial Consortium, Inc. (OGC) approved the OpenGIS® KML (formerly Keyhole Markup Language) Encoding Standard (OGC KML). The purpose of this memo is to nominate OGC KML for adoption as a NASA ESDS community standard with which to code and share visual geographic content in web-based outline maps and 3D geospatial browsers, such as ¹Google Earth™. Other projects (including Marble) have developed KML support.

This nomination is for version 2.2 of the OGC KML Encoding Standard. Future installations should consider use of the most recent version. Google originally developed KML to manage the display of geospatial data in Google Earth, and Google together with Galdos Systems Inc brought the KML version 2.2 to OGC for their endorsement. Google Earth continues to heavily use KML and other vendors provide tools and mapping websites using KML.

¹ Google and Google Earth are trademarks of Google Inc.

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6 Introduction

Keyhole, Inc. created Keyhole Earth Viewer, and Google acquired them in 2004 and renamed it Google Earth and developed KML for use with Google Earth. In 2008 OGC approved KML 2.2 specifications to become an international standard assuring its status as an open standard for all geo-browsers. Other projects such as Marble have also developed KML support.

OGC has four main objectives for the standard: 1) an international standard language to express geographic annotations and visualization on web-based maps and earth browsers, 2) alignments with international best practices and standards enabling interoperability of earth browser implementation, 3) ensure that OGC and Google work collaboratively and keep the KML community engaged, and 4) ensure proper life-cycle for the standard.

The KML file, an XML language focused on geographic visualization, specifies a set of features (marks, images, polygons, 3D models, textual descriptions, etc.) for display. For a geodetic reference system, KML uses a longitude/latitude/altitude geographic coordinate triplet, in that order, with negative values for west, south, and below sea level. Other data can view more specific items including tilt and heading. The visualization includes the presentation of the data on a globe and user control of where to look and go.

The OGC KML in addition to the geometry encoding and interpolation model defines an extension model in support of application profiles and conformance requirements and test cases.

7 Motivation to Adopt the OGC KML

OGC KML has become a powerful standard tool to represent and visualize scientific data. KML allows users to understand more intuitively by visualizing and manipulating spatial data with the

use of a virtual globe and merging of multidisciplinary geoscience data.

KML can be used to:

1. Specify icons and labels to identify locations
2. Create different visualizing positions to define unique views of features
3. Define overlays to attach
4. Define styles to specify feature appearance
5. Write descriptions of features, including hyperlinks and embedded images
6. Organize features into hierarchies
7. Locate and update retrieved documents from local or remote network locations
8. Define the location and orientation of textured 3D objects

KML offers the means to display geographic data from a wide variety of sources together in a geospatial context. This data includes imagery for the entire globe at varying resolutions that contains a great deal of interpretable visual information.

NASA Earth Science embracement of OGC KML standard allows for two opportunities: reduced costs for NASA and the user, and broader use of NASA data. NASA is under continual pressure to operate more efficiently and at the same time engender greater use of its products and services. OGC KML specifications (referenced in section 8) may extend the reach and use of NASA data to other government departments and the general citizenship, and will lower barriers between internal scientific uses and external applications.

OGC KML enables citizens, agencies, international community, and students to access and exploit the rich NASA data sets from their computers and browser software, driving costs down, and use and benefits up. Casual users create marks to identify their homes, describe journeys, and plan cross-country hikes and cycling ventures. Scientists provide detailed mappings of resources, models, and trends such as volcanic eruptions, weather patterns, earthquake activity, and mineral deposits. Real estate professionals, architects, and city development agencies propose construction and visualize plans. Students and teachers explore people, places, and events, both historic and current.

8 OpenGIS ® KML Encoding Standard

The overview about OGC KML 2.2 is available at:

<http://www.opengeospatial.org/standards/kml/>

The specification is rather lengthy, therefore the reference is provided to the standard. The OGC ® KML Encoding Standard, reference number: OGC 07-147r2, version: 2.2.0, date: 2008-04-14 is available at:

http://portal.opengeospatial.org/files/?artifact_id=27810

9 References

Informative References:

ESDS-RFC-026
Category: Standard
Updates/Obsoletes: None

ESDIS Standards Office (ESO)
March 2014
KML

<http://www.opengeospatial.org/specs/?page=abstract>

<http://www.opengeospatial.org/standards/is>

L. M. Ballagh, B. H. Raup, R. E. Duerr, S. J. S. Khalsa, C. Helm, D. Fowler, et al.,
"Representing scientific data sets in KML: Methods and challenges," Computers &
Geosciences, vol. 37, pp. 57-64, 2011

Appendix A: Glossary of Acronyms

| | |
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| 3D | Three Dimensional |
| ESDS | Earth Science Data Systems |
| ESDIS | Earth Science Data and Information Systems |
| ESO | ESDIS Standards Office |
| KML | Keyhole Markup Language |
| NASA | National Aeronautics and Space Administration |
| OGC™ | Open Geospatial Consortium, Inc. |
| OpenGIS ® | Registered Trademark of the OGC. |
| RFC | Request for Comment |
| XML | eXtensible Markup Language |